



Docket No.: 360842009710  
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:  
Daisuke YAHATA et al.

Application No.: 10/815,769

Confirmation No.: 9944

Filed: April 2, 2004

Art Unit: 1771

For: ALIPHATIC POLYESTER MULTI-FILAMENT  
CRIMP YARN FOR A CARPET, AND  
PRODUCTION METHOD THEREOF

Examiner: C. A. Juska

DECLARATION UNDER 37 CFR 1.131

MS Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Kazuya Matsumura, declare under penalty of perjury under the laws of the United States of America as follows:

1. I am one of the joint inventors, who filed the above-identified application on April 2, 2004.
2. The invention claimed in the subject application was completed prior to the April 10, 2002, filing date of the Okawa et al. reference (JP 2002-105752). A redacted copy of Test Request Cards/Test Result Reports and a redacted copy of Half Monthly Reports by the Industrial Material/Interior Engineering Section of Toray Industries are enclosed. All of these reports were prepared and dated prior to April 10, 2002. These reports have been redacted to remove portions not relevant to the claimed invention. In addition, an English translation of the relevant portions has been provided for your convenience.

va-207816

Application No.: 10/815,769

2

Docket No.: 360842009710

3. I do not know and do not believe that the invention has been in public use or on sale in this country, or patented or described in a printed publication in this or any other foreign country for more than one year prior to our application, and I have never abandoned our invention.

4. The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

5. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed at OTSU Japan, this Thurs day of June 14 2007.

Date: June 14, 2007

Kazuya Matsumura  
Kazuya MATSUMURA, Co-inventor

三井物産株式会社 機能資材部 三井物産株式会社

FAx 752-460

QRTZ-04-0204

産研部 研

### 試験依頼伝票

宛て先:品質保証課 横濱G

発行:産研部 (BCF-G)

品名 項目	2000-136-LD28 口度, 強度, 伸度, 縮収, 伸長率 (H), 伸長率 (G), 縮収, 変形度, 断面写真, 耐光性伸度保持率 (変形度, 断面写真は水準 No. 4, 5, 7 . 1170-54-258 H-6:耐光性伸度保持率対応)
数量	15CH (水準 7×2CH + 1CH (H-6)) 258.3158
目的	DSCKポリ乳酸BCFの試作 (B02-12)
記号 経歴	B-32M/c 2POS 水準 No. 1~6 水準 No. 7 (2本)
発行	
受理	

### 試験結果報告書

宛て先:産研部 (BCF-G) 西畑副部長

発行:品質保証課

別紙 参照									
(なお,耐光性評価については評価終了後別途報告)									
発行									
受理									







0808-10-500821

# N-BOF 試験結果報告書

あて先

東レ 繊維 検査 部  
第 1 課 糸 線  
生産 技術 部 N-BOF-Q

発行: 検査品質保証課






試験番号			目的				
品 種	2000-136-LD 28						
装 置	DSCK ポリ乳酸 BCF の試作 (802-12)						
特 性	試 料 単 位	水準 1	水準 2	水準 3			
正 置 端 度	dtex	5 sp	6 sp	5 sp	6 sp		
屈 強 力	N	22.9	23.5	19.9	18.9	15.4	15.0
屈 強 度	cN	1.50	1.55	1.36	1.31	0.97	0.95
伸 度	%	41.5	41.2	41.4	40.3	32.3	31.4
伸 縮 率	%	2.0	1.8	2.6	3.1	6.1	5.7
伸 縮 率	%						
伸 縮 率	%	1.0	1.2	1.0	1.0	0.9	0.9
伸 縮 率	%	6.3	5.8	5.8	5.5	9.0	8.8
伸 縮 率	%	7.1	7.0	6.8	7.1	7.6	7.2
伸 縮 率	%						
伸 縮 率	%						
結果の概要・試験方法							
発 行:		CFY1-12		受 取:			
  				  			

0708-10-590621

N-B OF 試驗結果報告

あて先  
 船 1 船 送 部  
 第 1 船 送 部  
 陸軍省 陸軍部 陸軍部 陸軍部 陸軍部  
 陸軍省 陸軍部 陸軍部 陸軍部 陸軍部

**先行：政權品質與經濟**

試験番号			目的				
品 種	2000-136-LD 28						
表 題	DSCK和V乳酸 BCFの試作(B02-12)						
特 性	試 料	水準 4	水準 5		水準 6		
	単位	5 sp	6 sp	5 sp	6 sp	5 sp	6 sp
正 常 織 度	dtex	1517	1506	2069	2051	2048	2046
乾 強 力	N	16.9	15.9	27.9	27.2	28.8	28.5
乾 強 度	oN	1.11	1.06	1.35	1.33	1.41	1.39
乾 伸 度	%	31.9	31.1	40.7	41.6	41.5	39.5
50% 水 収 縮 率	%	4.7	3.8	4.1	4.4	5.5	6.0
50% 水 伸 縮 率	%						
50% 水 伸 縮 率	%	1.0	1.0	1.0	1.0	0.8	1.0
50% 水 伸 縮 率	%	7.5	7.2	5.2	5.5	5.0	5.1
管 織 度	dtex	7.4	7.3	7.2	7.0	7.3	7.7
断面 密 形 状	-	4.23	3.81	3.75	4.09		
管 織 度	dtex						
結果の概要・試験方法							
発 行:		QFY1-12		受 理:			
  		31		 			

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080B-10-500621

# N-BOF 試験結果報告書

あて先

西條 隆造 部  
第1 係 課  
産研技術部 BOF-Q

発行: 製品品質保証課

試験番号			
品 種	2000-136-LD28	目 的	
装 題	Dack ポリ乳酸 BOF 試作 (BO2-12)		
特 性	試 験 単 位	水 準 7	
		5sp	6sp
正 規 試 験	dtex	1946	1956
乾 強 力	N	27.5	27.8
乾 強 度	cN	1.41	1.42
乾 伸 度	%	42.6	42.0
湿 伸 度 収 縮 率	%	4.1	3.7
湿 伸 度 収 縮 率	%		
放 弛 後 伸 縮 率	%	0.7	0.7
湿 伸 度 収 縮 率	%	5.1	6.3
伸 縮 率	%	7.5	7.4
断 面 変 形 率	-	3.86	3.98
中 心 変 形 率	%		
結果の概要・試験方法			
発 行:		QFY1-12	受 取:
			

4/4 (完)

[illegible]

0808-10-500821

# N-BOF 試験結果報告書

あて先

国産繊維部  
第1課糸線  
室長技師 BOF-G

発行: 製品品質保証課

試験番号								
品名	1170-68-PLAY							
変異	ポリ乳酸繊維加工系の 中性確認 (後熱処理、乾熱エアー)							
特注	1170-68-PLAY							
単位	2	3	4	5	7	9	10	
正口密度 dtex	1089	1021	1023	1326	978	979	989	
乾強度 N	16.2	18.6	18.8	10.6	16.2	19.4	18.6	
乾強度 cN	1.49	1.82	1.84	0.80	1.66	1.98	1.88	
乾伸度 %	44.3	37.9	35.5	50.1	35.0	33.6	35.9	
排水収縮率 %	1.3	2.3	3.3	2.3	2.0	3.6	1.8	
放縮後伸縮率 %	2.2	1.6	1.3	2.0	1.7	1.7	1.6	
排水後伸縮率 %	8.0	3.9	3.3	11.5	5.8	2.6	6.1	
繊維強度 4500	8.0	8.1	6.6	9.4	7.7	4.6	7.4	
繊維伸度								
繊維重量								
結果の概要・試験方法								
発行:	QFY1-12							
受取:	西畑 担当 本田							

QRTZ-04-0204

# 試験依頼伝票

宛て先:品質保証課機織G

発行:産FY技術部(BCF-G)

品名 項目	2200-136-PLAY 鋼度、強度、伸度、破収、伸長率(前)、伸長率(後)、山減、耐摩損度
数量	10CH (検-1,2のみ)
目的	ポリ乳酸捲縮加工系の物性確認
記事 経歴	CPN A-2m/c 7, 8 POS 検-1, 2 水準 No. ①~③
発行	
受理	
担当者	

# 試験結果報告書

宛て先:産FY技術部(BCF-G) 本田部員/西畑副部員 殿

QRQB-10-5007

発行:品質保証課

別紙参照									
発行									
受理									
担当者									

$\frac{2}{3}$

0584342221

QF08-10-50081

# N-BOF 試験結果報告書




あて先  
東レ 岡崎 工場  
第1製糸課  
経理部 BCF-G

発行: 品質保証課

試験番号		受付 年 月 日	測定 年 月 日
品 種		目 的	
密 度			



特 性		試 料 単位	2200-136-PLAY			
			水準-⑤	⑥	⑦	⑧
正 量 密 度	dtex		2274	2272	2275	2307
乾 強 力	N		30.4	33.0	40.3	36.7
乾 強 度	cN		1.34	1.45	1.77	1.59
乾 伸 度	%		30.8	27.1	40.9	25.5
即 水 収 縮 率	%		7.9	3.6	3.1	3.0
<del>乾 伸 縮 率</del>	<del>%</del>					
放 回 後 伸 縮 率	%		0.9	1.6	1.7	1.2
即 水 後 伸 縮 率	%		7.2	9.0	7.4	7.0
<del>乾 伸 縮 率</del>	<del>%</del>					
<del>乾 伸 縮 率</del>	<del>%</del>					
<del>乾 伸 縮 率</del>	<del>%</del>					

結果の概要・試験方法

発 行:	QFY1-12	受 理:
		
担当		

3 / 3 (完)

  
**Test Request Card****Addressee:** Quality Control Division Fiber G**Issued by:** Industrial FY Engineering Department (BCF-G)

<b>Product Name</b>	2006-136-LD28				
<b>Item</b>	fineness, strength, stretching, boiling water shrinkage, elongation rate (before), elongation rate (after), crimp number, deformation degree, cross-sectional photograph, retention of light resistance and stretching (The deformation degree and the cross-sectional photograph are standards No. 4, 5 and 7. 1170-54-258 N-6: corresponding to the retention of light resistance and stretching)				
<b>The Number of Samples</b>	15CH (standard 7 × 2CH + 1CH (N-6))				
<b>Purpose</b>	Experimental Manufacture of DSCK Polylactic Acid BCF (B02-12)				
<b>Description</b>	B-32m/c 2POS				
<b>History</b>			 Mass Products		
	standard No.1~6		standard No.7		
<b>Issue</b>			<b>Receipt</b>		
<b>Person in charge</b>			<b>Person in charge</b>		

## N-BCF Test Result Report

**Addressee:** Fiber Manufacture Department  
 The First Yarn Making Division  
 Industrial FY Engineering Department BCF-G

**Issued by:** Fiber Quality Control Division

<b>Experimental Number</b>		Received on [REDACTED]
<b>Product Class</b>	2000-136-LD28	Measured on [REDACTED]
<b>Title</b>	Experimental Manufacture of DSCK Polylactic Acid BCF (B02-12)	<b>Purpose</b>

Sample		Standard 1		Standard 2		Standard 3	
Properties	Unit	5sp	6sp	5sp	6sp	5sp	6sp
Total Fineness	dtex	1523	1515	1461	1444	1582	1587
Dry Extracting Force	N	22.9	23.5	19.9	18.9	15.4	15.0
Dry Strength	cN	1.50	1.55	1.36	1.31	0.97	0.95
Dry Elongation	%	41.5	41.2	41.4	40.3	32.3	31.4
Boiling Water Shrinkage	%	2.0	1.8	2.6	3.1	6.1	5.7
crimp elongation rate	%	1.0	1.2	1.0	1.0	0.9	0.9
crimp elongation rate after being processed with boiling water	%	6.3	5.8	5.8	5.5	9.0	8.8
Crimp Number	number /25mm	7.1	7.0	6.8	7.1	7.6	7.2

Summary of Results and Test Method

Issue			Receipt		
Person in Charge			Person in Charge		

## N-BCF Test Result Report

**Addressee:** Fiber Manufacture Department  
 The First Yarn Making Division  
 Industrial FY Engineering Department BCF-G

**Issued by:** Fiber Quality Control Division

<b>Experimental Number</b>		Received on	
<b>Product Class</b>	2000-136-LD28	Measured on	
<b>Title</b>	Experimental Manufacture of DSCK Polylactic Acid BCF (B02-12)	<b>Purpose</b>	

Sample		Standard 4		Standard 5		Standard 6	
Properties	Unit	5sp	6sp	5sp	6sp	5sp	6sp
Total Fineness	dtex	1517	1506	2069	2051	2048	2046
Dry Extracting Force	N	16.9	15.9	27.9	27.2	28.8	28.5
Dry Strength	cN	1.11	1.06	1.35	1.33	1.41	1.39
Dry Elongation	%	31.9	31.1	40.7	41.6	41.5	39.5
Boiling Water Shrinkage	%	4.7	3.8	4.1	4.4	5.5	6.0
crimp elongation rate	%	1.0	1.0	1.0	1.0	0.8	1.0
crimp elongation rate after being processed with boiling water	%	7.5	7.2	5.2	5.5	5.0	5.1
Crimp Number	number /25mm	7.4	7.3	7.2	7.0	7.3	7.7
Deformation Degree of a Cross Section	-	4.23	3.81	3.75	4.09		

Summary of Results and Test Method

Issue			Receipt		
Person in Charge			Person in Charge		

## N-BCF Test Result Report

**Addressee:** Fiber Manufacture Department  
 The First Yarn Making Division  
 Industrial FY Engineering Department BCF-G

**Issued by:** Fiber Quality Control Division

<b>Experimental Number</b>		<b>Received on</b>
<b>Product Class</b>	2000-136-LD28	<b>Measured on</b>
<b>Title</b>	Experimental Manufacture of DSK Poly-lactic Acid BCF (B02-12)	<b>Purpose</b>

Sample		Standard 7					
Properties	Unit	5sp	6sp				
Total Fineness	dtex	1946	1965				
Dry Extracting Force	N	27.5	27.8				
Dry Strength	cN	1.41	1.42				
Dry Elongation	%	43.6	42.0				
Boiling Water Shrinkage	%	4.1	3.7				
crimp elongation rate	%	0.7	0.7				
crimp elongation rate after being processed with boiling water	%	5.1	6.3				
Crimp Number	number /25mm	7.5	7.4				
Deformation Degree of a Cross Section	-	3.86	3.98				

Summary of Results and Test Method

Issue			Receipt		
Person in Charge			Person in Charge		

**Test Request Card**

**Addressee:** Quality Control Division Fiber G

**Issued by:** Industrial FY Engineering Department (BCF-G)

<b>Product Name</b> <b>Item</b>  <b>The Number of Samples</b>	1170-68-PLAY fineness, strength, stretching, boiling water shrinkage, elongation rate (before), elongation rate (after), the number of crimps 7CH		
<b>Purpose</b>	Confirmation of Physical Properties of Polylactic Acid Crimped Textured Yarn (heat treatment at a low temperature, dry hot air)		
<b>Description</b>  <b>History</b>	2, 3, 4, and 5 Current Products CPN A-2m/c 7POS , A-3m/c 1POS <div style="background-color: black; width: 50px; height: 15px; margin: 5px 0;"></div> Standard No.2~5, 7, 9, 10		
<b>Issue</b>		<b>Receipt</b>	
Person in Charge			Person in Charge

## N-BCF Test Result Report

**Addressee:** Fiber Manufacture Department  
 The First Yarn Making Division  
 Industrial FY Engineering Department BCF-G  
**Issued by:** Fiber Quality Control Division

<b>Experimental Number</b>		Received on [REDACTED]
<b>Product Class</b>	1170-68-PLAY	Measured on [REDACTED]
<b>Title</b>	Confirmation of Physical Properties of Polylactic Acid Crimped Textured Yarn (heat treatment at a low temperature, dry hot air)	<b>Purpose</b>

Sample		1170-68-PLAY						
Properties	Unit	2	3	4	5	7	9	10
Total Fineness	dtex	1089	1021	1023	1326	978	979	989
Dry Extracting Force	N	16.2	18.6	18.8	10.6	16.2	19.4	18.6
Dry Strength	cN <sup>*</sup>	1.49	1.82	1.84	0.80	1.66	1.98	1.88
Dry Elongation	%	44.3	37.9	35.5	50.1	35.0	33.6	35.9
Boiling Water Shrinkage	%	1.3	2.3	3.3	2.3	2.0	3.6	1.8
crimp elongation rate	%	2.2	1.6	1.3	2.0	1.7	1.7	1.6
crimp elongation rate after being processed with boiling water	%	8.0	3.9	3.3	11.5	5.8	2.6	6.1
Crimp Number	number /25mm	8.0	8.1	6.6	9.4	7.7	4.6	7.4


Summary of Results and Test Method

Issue			Receipt		
Person in Charge			Person in Charge		

  
Test Request Card

Addressee: Quality Control Division Fiber G

Issued by: Industrial FY Engineering Department (BCF-G)

<b>Product Name</b>	2200-136-PLAY		
<b>Item</b>	fineness, strength, stretching, boiling water shrinkage, elongation rate (before), elongation rate (after),		
<b>The Number of Samples</b>	the number of crimps, heat resistant stretching (Only Sample-1 and Sample-2) 10CH		
<b>Purpose</b>	Confirmation of Physical Properties of Polylactic Acid Crimped Textured Yarn		
<b>Description</b>	CPN A-2m/c 7,8POS		
<b>History</b>	 Sample-1,2      Standard No.①~⑧		
<b>Issue</b>			
Person in Charge			
<b>Receipt</b>			
Person in Charge			

## N-BCF Test Result Report

**Addressee:** Fiber Manufacture Department  
 The First Yarn Making Division  
 Industrial FY Engineering Department BCF-G  
**Issued by:** Fiber Quality Control Division

<b>Experimental Number</b>		Received on	
<b>Product Class</b>	2200-136-PLAY	Measured on	
<b>Title</b>	Confirmation of Physical Properties of Polylactic Acid Crimped Textured Yarn	<b>Purpose</b>	

Sample		2200-136-PLAY					
Properties	Unit	Sample		Standard			
		1	2	①	②	③	④
Total Fineness	dtex	2244	2268	2163	2142	2217	2209
Dry Extracting Force	N	31.2	36.2	31.3	36.0	30.6	32.4
Dry Strength	cN	1.39	1.60	1.45	1.68	1.38	1.47
Dry Elongation	%	34.1	38.6	35.3	36.2	30.0	35.4
Boiling Water Shrinkage	%	3.6	1.8	0.6	1.1	4.1	3.2
crimp elongation rate	%	1.3	2.4	4.4	3.1	2.0	1.6
crimp elongation rate after being processed with boiling water	%	10.6	10.6	11.3	10.3	8.7	9.8
Crimp Number	number /25mm	7.7	8.6				
Heat Resistant Strength at 150°C for 30 minutes	N	27.6	33.5				
HeatResistant Elongation at 150°C for 30 minutes	%	36.0	42.6				
Heat Resistant Retention of Strength at 150°C for 30 minutes	%	88.5	92.5				
Heat Resistant Retention of Elongation at 150°C for 30 minutes	%	105.6	110.4				
Issue		Receipt					
Person in Charge				Person in Charge			

## N-BCF Test Result Report

**Addressee:** Fiber Manufacture Département  
The First Yarn Making Division  
Industrial FY Engineering Department BCF-G

**Issued by:** Fiber Quality Control Division

<b>Experimental Number</b>		Received on [REDACTED] Measured on [REDACTED] 2001
<b>Product Class</b>	2200-136-PLAY	<b>Purpose</b>
<b>Title</b>	Confirmation of Physical Properties of Polylactic Acid Crimped Textured Yarn	

Sample		2200-136-PLAY					
Properties	Unit	Standard					
		⑤	⑥	⑦	⑧		
Total Fineness	dtex	2274	2272	2275	2307		
Dry Extracting Force	N	30.4	33.0	40.3	36.7		
Dry Strength	cN	1.34	1.45	1.77	1.59		
Dry Elongation	%	30.8	37.1	40.9	35.5		
Boiling Water Shrinkage	%	7.9	3.6	3.1	3.0		
crimp elongation rate	%	0.9	1.6	1.7	1.2		
crimp elongation rate after being processed with boiling water	%	7.2	9.0	7.4	7.0		
Summary of Results and Test Method							

Issue			Receipt		
Person in Charge			Person in Charge		

1. ポリ乳酸繊維の非衣料用途開発

(1) トヨタコンソーシアム関連

- A. Lポリ乳酸BCF使いのオプションマットは、トヨタ純正技術標準規格(TSF)に基づく評価の結果、臭気性を除くすべての項目が基準値をクリアし、2003年6月発売の“ラウム”に採用が内定した。東和織物委託により、東レから豊田通商にテキスタイル原反を供給することに決定し、2002年6月目標で今後生産技術を詰める。

**1. ポリ乳酸繊維の非衣料用途開発**

- (1) トヨタコンソーシアム関連において、トヨタ自動車は、2003年6月発売の小型自動車（ピッツ）にポリ乳酸短繊維使いのバックドアボード、及びポリ乳酸BCF使いのオプションマットを本格採用することに決めた。現在、上記車輛規格を前提にした原綿（6d-51mm）、BCF（20.00D）の中量試作のための検討を開始した。

1. ポリ乳酸繊維の非衣料用途展開

ポリ乳酸BCF第2回試作糸1170T-68fを用いて、東和織物にて先染糸によるカーマットを試作した結果、染色堅牢度は4級をクリアし、品位等にも大きな問題はなかった。タフト針による融着が認められ、今後、加工条件の適正化を進める。



## 2. ポリ乳酸繊維のカーペットパイル糸への展開

ポリ乳酸繊維を用いたBCF加工糸の染着挙動を確認した結果、濃色系について、110℃で分散性、物性ともにほぼ問題ないことを確認した。また、発色性は良好であるが、染色堅牢度はPET対比劣位であり、今後改善検討を進める。



Year: H13 (2001)

Month: [REDACTED]

Section: [REDACTED]

Name of Section and Group: Industrial Material · Interior  
Engineering Section

### Report

#### 2. Development of Polylactic Acid Fiber to Pile Yarn for Carpets

The dying behavior of BCF textured yarn using polylactic acid fiber was tested; as a result, it was confirmed that there was almost no problem in dispersibility and physical properties at 110°C in case of a deep color system. Also, the chromogenic property is good, but the dye fastness is inferior to that of PET. We are going to study and develop the improvement in the future.

Creation Date: [REDACTED]

Creator: Takashi Shiotani/TORAY

Year: H13 (2001)

Month: [REDACTED]

Section: [REDACTED]

Name of Section and Group: Industrial Material / Interior  
Engineering Section

### Report

#### 1. Development of Polylactic Acid Fiber for Use of Non-Clothing Material

Prototype car mats were made of colored yarns using the second prototype polylactic acid BCF yarn 1170T-68f by TOWA ORIMONO CO., LTD.; as a result, they passed the fourth class of the dye fastness, and there was no big problem in appearance quality and the like. However, fusion bonding was caused on the mats by using tuft needles, and accordingly, the optimization of the processing conditions will be studied in the future.

Creation Date: [REDACTED]

Creator: Takashi Shiotani/TORAY

Year: H13 (2001)

Month: [REDACTED]

Section: [REDACTED]

Name of Section and Group: Industrial Material · Interior  
Engineering Section

### Report

#### 1. Development of Polylactic Acid Fiber for Use of Non-Clothing Material

- (1) In connection with TOYOTA Consortium, TOYOTA MOTOR CORPORATION has decided that back door boards using the polylactic acid short fiber and optional mats using the polylactic acid BCF will be officially used in the minicar (Bits) released in June, 2003. Now, we started to study for the medium-volume trial manufacture of the raw cotton (6 d-51 mm) and BCF (2000D) based on the above-mentioned motor vehicle standard.

Creation Date: [REDACTED]

Creator: Takashi Shiotani/TORAY

Year: H13 (2001)

Month: [REDACTED]

Section: [REDACTED]

Name of Section and Group: Industrial Material · Interior  
Engineering Section

### Report

#### 1. Development of Polylactic Acid Fiber for Use of Non-Clothing Material

##### (1) TOYOTA Consortium Relationship

A. The optional mats using the L-polylactic acid BCF were evaluated based on TOYOTA Specified Parts Technology Standards (TSF); as a result, it was confirmed that the mats reached standard levels in all items other than odor, and they were informally decided to be used in "RAUM", which will be released in June 2003. It was decided that the whole textile cloth, consigned by TOWA ORIMONO CO., LTD., is supplied to TOYOTA TSUSHO CORPORATION from TORAY Industries, Inc., and the manufacturing technique will be finalized with the goal of starting the supply in June, 2002 in the future

Creation Date: [REDACTED] Creator: Takashi Shiotani/TORAY